E 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648-XC102]

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Sand Island Pile Dikes Repairs in the Columbia River

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; proposed incidental harassment authorizations (IHAs); request for comments on proposed authorizations and possible renewal.

SUMMARY: NMFS has received a request from the U.S. Army Corps of Engineers (Corps) for authorization to take marine mammals incidental to the Sand Island Pile Dikes Repairs Project in the Columbia River. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue two consecutive IHAs to incidentally take marine mammals during the specified activities. NMFS is also requesting comments on possible one-time, one-year renewals for each IHA that could be issued under certain circumstances and if all requirements are met, as described in **Request for Public Comments** at the end of this notice. NMFS will consider public comments prior to making any final decision on the issuance of the requested MMPA authorization and agency responses will be summarized in the final notice of our decision.

DATES: Comments and information must be received no later than [*insert date 30 days after date of publication in the FEDERAL REGISTER*].

ADDRESSES: Comments should be addressed to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service and should be submitted via email to *ITP.Fowler@noaa.gov*.

Instructions: NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period. Comments, including all attachments, must not exceed a 25-megabyte file size. All comments received are a part of the public record and will generally be posted online at *www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act* without change. All personal identifying information (*e.g.*, name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: Amy Fowler, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities*. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the "take" of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq*.) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are proposed or, if the taking is limited to harassment, a notice of a proposed incidental harassment authorization is provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable

adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other "means of effecting the least practicable adverse impact" on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for taking for certain subsistence uses (referred to in shorthand as "mitigation"); and requirements pertaining to the mitigation, monitoring and reporting of the takings are set forth. The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq*.) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our proposed action (*i.e.*, the issuance of an IHA) with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in Categorical Exclusion B4 (IHAs with no anticipated serious injury or mortality) of the Companion Manual for NOAA Administrative Order 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion. Accordingly, NMFS has preliminarily determined that the issuance of the proposed IHAs qualifies to be categorically excluded from further NEPA review.

We will review all comments submitted in response to this notice prior to concluding our NEPA process or making a final decision on the IHA request.

Summary of Request

On March 4, 2022, NMFS received a request from the Corps for two IHAs to take marine mammals incidental to the Sand Island Pile Dikes Repairs Project in the Columbia River over the course of two years. The application was deemed adequate and complete on June 9, 2022. The Corps' request is for take of 7 species of marine mammals by Level B harassment and, for a subset of these species (harbor seal (*Phoca vitulina*) and harbor porpoise (*Phocoena phocoena*)), Level A harassment. Neither the Corps nor NMFS expect serious injury or mortality to result from these activities and, therefore, IHAs are appropriate.

Description of Proposed Activity

Overview

The Sand Island pile dikes are part of the Columbia River pile dike system and are comprised of 4 pile dikes, which are named according to river mile (RM) location, at RMs 4.01, 4.47, 5.15, and 6.37. The purpose of the Sand Island Pile Dikes Repairs project is to perform needed repairs. The existing timber pile dikes at Sand Island consist of three rows of vertical timber pilings between 12 and 20 inches (in) in diameter with two rows of horizontal spreaders, which provide structural stability of the vertical timber pilings. A cluster of piles with one or more taller piles, called an outer dolphin with king piles, is used to anchor and mark the end for navigational safety. There is rock apron at the base of the vertical piles and at the shore connection to protect against scour. The existing pile dikes have deteriorated greatly due to lack of maintenance.

It was determined that at the channel-ward ends of the pile dikes, replacement of the existing, deteriorated piles with new piles is necessary but that in shallower water depths, it is possible to remove timber pilings completely and add rock for higher enrockment elevation to achieve equivalent hydraulic and sediment transport functions. The project design team also determined that steel piles can provide equivalent hydraulic function and do not require horizontal spreaders, thus reducing required construction

materials. In addition it is feasible to cap steel piles with cones to discourage piscivorous bird perching.

The major project elements proposed to be conducted under these IHAs include work at pile dikes 6.37 and 5.15. The Corps proposes to remove existing timber piles, drive new steel pipe piles and place rock for multiple purposes including scour protection at the base of the new piles, enhanced enrockment segments, shore connections, and revetment along the western portion of the shoreline at East Sand Island.

Dates and Duration

The Sand Island Pile Dikes Repairs Project is planned to take a total of 3 or 4 years to complete, with in-water work beginning in August 2023. The first IHA would be valid from August 1, 2023 to July 31, 2024, and the second would be valid August 1, 2024 through July 31, 2025, but in-water work would only occur between August and November each year. The Corps would apply separately for the future IHA(s) to conduct similar work at pile dikes 4.01 and 4.47 .

Specific Geographic Region

One of the pile dikes is connected to West Sand Island (4.01), two of the pile dikes are connected to East Sand Island (4.47, 5.15), and the fourth pile dike (6.37) is in open water and runs parallel to the Chinook Federal Navigation Channel on the upstream side. The three pile dikes connected to West Sand Island and East Sand Island are located within Oregon, while the fourth pile dike in open water spans both Oregon and Washington. The Sand Island pile dikes are located in the downstream terminus of the Columbia River tidal estuary, which is dominated by freshwater inputs from the Columbia and Willamette rivers. This estuary stretches from the mouth upstream to

Bonneville Dam at RM 146.

Figure 1. Location of Sand Island Pile Dikes

Detailed Description of Specific Activity

Hydraulic modeling of the Sand Island Pile Dike System demonstrated that existing timber piles would need to be removed because leaving them in place would affect the hydraulic function of the new design. Existing timber piles may be removed by pulling, cutting or snapping at the approximate level of the enrockment. Vibratory hammers will not be used for timber pile removal. Pile removal is expected to proceed incrementally as replacement repairs are made to ensure that overall function is maintained during construction. The original construction of the four pile dikes included 3,936 timber piles. It is estimated that 20 percent of those are now missing and that approximately 3,000 will be removed and disposed of. Take of marine mammals is not expected to occur from removal of timber piles, therefore the Corps has not calculated the precise number of piles to be removed and removal of timber piles will not be discussed further in this document.

The proposed pile dike design is an offset of the existing pile dike alignment, with piles driven approximately 30 feet (ft; 9.1 meters (m)) downstream of existing centerline. The pile configuration needed to achieve hydraulic and sediment transport functions includes two rows of 24" steel pipe piles, staggered and spaced 6.2 ft (1.9 m) on center. Each pile dike would be 80 ft (24.4 m) long.

The Corps estimates a total of 376 24-in steel pipe piles would be installed at the two pile dike locations (pile dikes 6.37 and 5.15) and 18 24-in steel pipe piles will be installed as marker piles along the enrockment at these two pile dikes (Tables 1 and 2). The expected minimum embedment depths for each pile are between approximately 30 and 40 ft (9.1 to 12.2 m).

The contractor may use barge-mounted cranes equipped with survey grade positioning software to ensure the piles are installed with precision. Piles are generally installed by a rig which supports the pile leads, raises the pile, and operates a hammer.

The Corps anticipates that vibratory hammers would be used to start the pile driving and will drive them 50 percent of the way, and impact hammers would be used to complete the pile driving for the remaining 50 percent. In the event that unusually difficult driving conditions are encountered, the contractor would be allowed to temporarily excavate the minimum amount of existing scour protection rock needed in order to drive the new pile. The contractor would then reinstall the rock to provide scour protection for the new pile.

Land based work would be necessary at pile dike 5.15 to remove some existing timber piles and improve the existing pile dike shore connections and sections of enhanced enrockment that are too shallow for barge-based equipment access. Construction of pile dike 6.37 would occur by over-water equipment only. Conceptual locations for a temporary material off-loading facility (MOF) and staging areas have been chosen based upon multiple constraints including cultural resources, avian presence, ordinary high water depths, and tidal currents, especially during ebb tide. Approaching and landing a barge may not be feasible or safe during some periods of the day during high tidal velocities. The MOF pilings supporting dolphins would be installed by barge using vibratory pile driving only. It is estimated that a maximum of 24 steel pipe piles with a maximum diameter of 24 inch and up to 100 (24-inch) AZ steel sheet piles would be required for the MOF. All piles installed to construct the MOF would be subsequently removed in the same year.

Table 1. Year 1 Proposed Pile Driving

Project element	Pile size and type	Method	Number of piles	Maximum piles per day	Duration or strikes per pile	Estimated days of work	Estimated month of work
Pile dike 6.37	24-in steel pipe	Vibratory install	171[a]	14[b]	15 minutes	56	August-September
Pile dike 6.37	24-in steel pipe	Impact install			225 strikes		

MOF	24-in steel pipe	Vibratory install	Up to 24[c]	5	30 minutes	5	October
MOF	24-in steel pipe	Vibratory removal		20	5 minutes	1	October
MOF	24-in steel sheet	Vibratory install	Up to 100[c]	25	10 minutes	4	October
MOF	24-in steel sheet	Vibratory removal		50	3 minutes	1	October
Total days of work						67	

[a] A total of 244 steel pipe piles will be installed at PD 6.37 over the two years, with approximately 70 percent installed in year 1 and the remaining 30 percent installed in year 2. These same 171 piles will be installed using both vibratory and impact hammers.
[b] The Corps estimates an average of 5 piles will be installed per day but could be up to 14 per day.
[c] The same MOF piles will be installed and subsequently removed.

Table 2. Year 2 Proposed Pile Driving

Project element	Pile size and type	Method	Number of piles	Maximum piles per day	Duration or strikes per pile	Estimated days of work	Estimated month of work
Pile dike 6.37	24-in steel pipe	Vibratory install	73[a]	14[b]	15 min	24	August
		Impact install			225 strikes		
Pile dike 5.15	24-in steel pipe	Vibratory install	150	14	15 min	71	August-November
		Impact install			225 strikes		
Total days of work						95	

[a] These same 73 piles will be installed using both vibratory and impact hammers.
[b] The Corps estimates an average of 5 piles will be installed per day but could be up to 14 per day.

Proposed mitigation, monitoring, and reporting measures are described in detail later in this document (please see **Proposed Mitigation** and **Proposed Monitoring and Reporting**).

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history of the

potentially affected species. NMFS fully considered all of this information, and we refer the reader to these descriptions, incorporated here by reference, instead of reprinting the information. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SARs; *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*) and more general information about these species (*e.g.*, physical and behavioral descriptions) may be found on NMFS' website (*https://www.fisheries.noaa.gov/find-species)*.

Table 3 lists all species or stocks for which take is expected and proposed to be authorized for this activity, and summarizes information related to the population or stock, including regulatory status under the MMPA and Endangered Species Act (ESA) and potential biological removal (PBR), where known. PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS' SARs). While no serious injury or mortality is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS' stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS' U.S. Pacific and Alaska SARs. All values presented in Table 3 are the most recent available at the time of publication and are available in the 2020 SARs (Carretta *et al.*, 2021; Muto *et al.*, 2022)

and draft 2021 SARs (available online at:

https://www.fisheries.noaa.gov/national/marine-mammal-protection/draft-marine-mammal-stock-assessment-reports).

Table 3. Species Likely Impacted by the Specified Activities

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N)[1]	Stock abundance (CV, N_{min}, most recent abundance survey)[2]	PBR	Annual M/SI[3]
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Balaenopteridae (rorquals)						
Humpback whale	*Megaptera novaeangliae*	California/Oregon/Washington	E, D, Y	4,973 (0.05, 4,776, 2018)	28.7	≥ 48.6
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Killer Whale	*Orcinus orca*	West Coast Transient	-, -, N	349[4] (N/A, 349, 2018)	3.5	0.4
Family Phocoenidae (porpoises)						
Harbor Porpoise	*Phocoena phocoena*	Northern Oregon/Washington Coast	-, -, N	21,487 (0.44, 15,123, 2011)	151	≥3.0
Order Carnivora – Superfamily Pinnipedia						
Family Otariidae (eared seals and sea lions)						
California Sea Lion	*Zalophus californianus*	U.S.	-, -, N	257,606 (N/A,233,515, 2014)	14,011	>320
Steller Sea Lion	*Eumetopias jubatus*	Eastern	-, -, N	43,201[5] (see SAR, 43,201, 2017)	2,592	112
Family Phocidae (earless seals)						
Harbor Seal	*Phoca vitulina*	Oregon/Washington Coast	-, -, N	24,732[6] (UNK, UNK, 1999)	UND	10.6
Northern Elephant Seal	*Mirounga angustirostris*	California Breeding	-, -, N	187,386 (N/A, 85,369, 2013)	5,122	13.7

[1] ESA status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

[2] NMFS marine mammal stock assessment reports online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region.* CV is coefficient of variation; Nmin is the minimum estimate of stock abundance.

[3] These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.*, commercial fisheries, ship strike). Annual mortality/serious injury (M/SI) often cannot be determined precisely and is in some cases presented as a minimum value or range.

[4] Based on counts of individual animals identified from photo-identification catalogues. Surveys for abundance estimates of these stocks are conducted infrequently.

[5] Best estimate of pup and non-pup counts, which have not been corrected to account for animals at sea during abundance surveys.

[6] The abundance estimate for this stock is greater than eight years old and is therefore not considered current. PBR is considered undetermined for this stock, as there is no current minimum abundance estimate for use in calculation. We nevertheless present the most recent abundance estimates, as these represent the best available information for use in this document.

As indicated above, all 6 species (with 6 managed stocks) in Table 3 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur. All species that could potentially occur in the proposed project area are included in Table 4 of the IHA application. While gray whales (*Eschrichtius robustus*) and killer whales from the Southern Resident Distinct Population Segment (DPS) and stock have been reported near the mouth of the Columbia River, the temporal and/or spatial occurrence of these species is such that take is not expected to occur, and they are not discussed further beyond the explanation provided here.

Gray whales have not been documented near the proposed project area although anecdotal evidence indicates they have been seen at the mouth of the Columbia River. However, they are not a common visitor as they mostly remain in the vicinity of the offshore shelf-break (Griffith 2015). They migrate along the Oregon coast in three discernible phases from early December through May (Herzing and Mate 1984). Therefore, they are unlikely to occur near the project area between August and November. Monitoring reports from recent IHAs issued to the Corps for similar construction work on the Columbia River Jetty System (*e.g.*, 82 FR 15046; March 23, 2017) reported no observations of gray whales. Given the size of gray whales, they could be readily identifiable at a considerable distance. If a gray whale were to approach the established Level B harassment isopleths, shutdown would be initiated to avoid take. The Corps would employ at least one vessel-based protected species observer (PSO) who would be able to adequately monitor these zones. Therefore, NMFS does expect take of gray whales to occur and no take is proposed to be authorized.

Historically, killer whales were regular visitors in the vicinity of the estuary. However, they are much less common presently and are rarely seen in the interior of the Columbia River Jetty system (Wilson 2015). Southern Resident killer whales have been

documented near the mouth of the Columbia River but these observations have most commonly been during the late-winter to early-spring months (NMFS 2021), outside of the proposed construction window for these projects. Monitoring reports from recent IHAs issued to the Corps for similar construction work on the Columbia River Jetty System (*e.g.*, 82 FR 15046; March 23, 2017) reported no observations of killer whales. While it is possible that killer whales from the West Coast Transient stock may enter the project area (see **Estimated Take** section), it is unlikely that take of Southern Resident killer whales would occur, and no take is proposed to be authorized.

Humpback Whale

Prior to 2016, humpback whales were listed under the ESA as an endangered species worldwide. Following a 2015 global status review (Bettridge *et al*., 2015), NMFS delineated 14 distinct population segments (DPSs) with different listing statuses (81 FR 62259; September 8, 2016) pursuant to the ESA. The DPSs that occur in U.S. waters do not necessarily equate to the existing stocks designated under the MMPA and shown in Table 1. Because MMPA stocks cannot be portioned, *i.e*., parts managed as ESA-listed while other parts managed as not ESA-listed, until such time as the MMPA stock delineations are reviewed in light of the DPS designations, NMFS considers the existing humpback whale stocks under the MMPA that overlap with endangered or threatened DPSs to be depleted for MMPA management purposes (*e.g*., selection of a recovery factor, stock status). All humpback whales in the project area would be from the California/Oregon/Washington stock (Carretta *et al*., 2019). These animals belong almost exclusively to the Mexican and Central American DPSs, which are listed as threatened and endangered under the ESA, respectively. According to Wade *et al.* (2021), the probability that humpback whales encountered in Oregon and California (*i.e.*, south of the Columbia River) are as follows: Mexico DPS, 58 percent; and Central America DPS, 42 percent. In Washington and Southern British Columbia waters (*i.e.*, north of the

Columbia River) are as follows: Hawai'i DPS (unlisted), 69 percent; Mexico DPS, 25 percent; and Central America DPS, 6 percent (Wade *et al.*, 2021). Since the Columbia River is considered the dividing line between these two areas, the exact proportion of humpback whales taken incidental to the Corps' activities from each of the three DPSs cannot be determined; however, we assume some of the humpback whales taken would be from a listed DPS.

Humpback whales are primarily found on the continental shelf and slope (Adams *et al*., 2014). Humpback whales are typically seen off the Oregon coast from April to October, with peak numbers from June through August (Green *et al*., 1991). Humpback whale feeding groups have begun utilizing the mouth of the Columbia River as foraging ground, arriving in the lower Columbia estuary as early as mid-June, and have been observed as late as mid-November with a peak of abundance coinciding with the peak abundance of forage fish in mid-summer. Humpback whales were observed in the immediate vicinity of West and East Sand Islands in late summer and fall of 2015 and 2016 (The Columbian, 2016). They were also observed in the area in 2017 and 2019, but their presence was not documented there in 2018 (The Columbian, 2019). Most recently they were again seen earlier in the season than ever, at the beginning of April in 2020 (Chinook Observer, 2020). Based on this information, it is possible that humpback whales may pass through and may forage intermittently in the immediate project vicinity.

Killer Whale

Killer whales are found in waters throughout the North Pacific. Along the west coast of North America, 'resident,' transient,' and 'offshore' ecotypes have overlapping distributions and multiple stocks are recognized within that broader classification scheme. The West Coast Transient stock includes animals that range from California to southern Alaska, and is genetically distinct from other transient populations in the region (*i.e*., Gulf of Alaska, Aleutian Islands, and Bering Sea transients and AT1 transients)

(Carretta *et al.*, 2021; Muto *et al*., 2021). The main diet of transient killer whales consists of marine mammals. Along the Washington and Oregon coast, transient killer whales primarily hunt pinnipeds and porpoises, though some groups will occasionally target larger whales. The seasonal movements of transients are largely unpredictable, although there is a tendency to investigate harbor seal haulouts off Vancouver Island more frequently during the pupping season in August and September (Baird 1994; Ford 2014). While not regularly seen in the project area, transient killer whales have been observed near the mouth of the Columbia River in March and April and a pod of transient killer whales were detected near the Astoria Bridge in May of 2018 (Frankowicz 2018).

Harbor Porpoise

In the eastern North Pacific Ocean, harbor porpoise are found in coastal and inland waters from Point Barrow, along the Alaskan coast, and down the west coast of North America to Point Conception, California. Harbor porpoise are known to occur year-round in the inland trans-boundary waters of Washington and British Columbia, Canada and along the Oregon/Washington coast. The Northern Oregon/Washington Coast stock of harbor porpoises ranges from Lincoln City, OR, to Cape Flattery, WA (Carretta *et al*., 2019).

Harbor porpoises are usually found in shallow water, most often nearshore, although they occasionally travel over deeper offshore waters (NOAA 2013a). West Coast populations have more restricted movements and do not migrate as much as East Coast populations (Halpin, OBIS-SEAMAP 2019). Most harbor porpoise groups are small, generally consisting of less than five or six individuals, though for feeding or migration they may aggregate into large, loose groups of 50 to several hundred animals (Halpin, OBIS-SEAMAP 2019). Behavior tends to be inconspicuous, compared to most dolphins, and they feed by seizing prey which consists of wide variety of fish and cephalopods ranging from benthic or demersal (Halpern, OBIS-SEAMAP 2019). Harbor

porpoises are sighted year round near the mouth of the Columbia River (Griffith 2015). Their abundance peaks with the abundance of anchovy presence in the river and nearshore.

California Sea Lion

California sea lions are found along the west coast from the southern tip of Baja California to southeast Alaska. They breed mainly on offshore islands from Southern California's Channel Islands south to Mexico. Non-breeding males often roam north in spring foraging for food. Since the mid-1980s, increasing numbers of California sea lions have been documented feeding on fish along the Washington coast and—more recently—in the Columbia River as far upstream as Bonneville Dam, 145 mi (233 km) from the river mouth. Large numbers of California sea lions use the nearby South Jetty for hauling out (Jeffries 2000). According to Oregon Department of Fish and Wildlife (ODFW 2014) counts, most California sea lions are concentrated near the tip of the South Jetty. ODFW survey information (2007 and 2014) indicates that California sea lions are relatively less prevalent in the Pacific Northwest during June and July, though in the months just before and after their absence there can be several hundred using the South Jetty. More frequent Washington Department of Fish and Wildlife (WDFW 2014) surveys indicate greater numbers in the summer, and use remains concentrated to fall and winter months. Nearly all California sea lions in the Pacific Northwest are sub-adult and adult males (females and young generally stay in California).

Steller Sea Lion

The range of the Steller sea lion includes the North Pacific Ocean rim from California to northern Japan. Steller sea lions forage in nearshore and pelagic waters where they are opportunistic predators. There are two separate stocks of Steller sea lions, the Eastern U.S. stock, which occurs east of Cape Suckling, Alaska (144° W), and the Western U.S. stock, which occurs west of that point. Only the Western stock of Steller

sea lions, which is designated as the Western DPS of Steller sea lions, is listed as endangered under the ESA (78 FR 66139; November 4, 2013). Unlike the Western U.S. stock of Steller sea lions, there has been a sustained and robust increase in abundance of the Eastern U.S. stock throughout its breeding range. The eastern stock of Steller sea lions has historically bred on rookeries located in Southeast Alaska, British Columbia, Oregon, and California.

Large numbers of Steller sea lions use the nearby South Jetty for hauling out (Jeffries 2000) and are present, in varying abundances, all year. Use occurs chiefly at the concrete block structure at the terminus, or head of the jetty. According to ODFW (2014), during the summer months it is not uncommon to observe between 500-1,000 Steller sea lions present per day. Steller sea lions are most abundant in the vicinity during the winter months and tend to disperse elsewhere to rookeries during breeding season between May and July (Corps 2007). All population age classes, and both males and females, use the South Jetty to haul out.

While California sea lions also use this area and can intermingle with Steller sea lions, it appears that Steller out-compete California sea lions for the preferred haul out area. Previous monthly averages between 1995 and 2004 for Steller sea lions hauled out at the South Jetty head ranged from about 168 to 1,106 animals. ODFW data from 2000-2014 reflects a lower frequency of surveys, and numbers ranged from zero animals to 606 Steller sea lions (ODFW 2014). More frequent surveys by WDFW for the same time frame (2000-2014) put the monthly range at 177 to 1,663 animals throughout the year.

Pacific Harbor Seal

Harbor seals range from Baja California, north along the western coasts of the United States, British Columbia and southeast Alaska, west through the Gulf of Alaska, Prince William Sound, and the Aleutian Islands, and north in the Bering Sea to Cape Newenham and the Pribilof Islands. They are one of the most abundant pinnipeds in

Oregon and can typically be found in coastal marine and estuarine waters of the Oregon coast throughout the year. On land, they can be found on offshore rocks and islands, along shore, and on exposed flats in the estuary (Harvey 1987). In 2002, the estimated absolute abundance of harbor seals on the Oregon coast (excluding Hunters Island) was 10,087 (95 percent confidence interval: 8,445-12,046) animals (Brown *et al*., 2005). Harbor seals are known to use the Chinook Channel/Baker Bay area during low tides for hauling out (Jeffries 2000). They haul out on rocks, reefs, beaches, and drifting glacial ice and feed in marine, estuarine, and occasionally fresh waters. Harbor seals generally are non-migratory, with local movements associated with tides, weather, season, food availability, and reproduction. Harbor seals do not make extensive pelagic migrations (Carretta *et al*., 2019). The most recent estimated population of harbor seals in the Oregon/Washington Coast stock was 24,732 based on surveys conducted in 1999 (Carretta *et al.*, 2014). Based on the analyses of Jeffries *et al*. (2003) and Brown *et al*. (2005), both the Washington and Oregon portions of this stock were reported as reaching carrying capacity. However, in the absence of recent abundance estimates, the current population trend is unknown.

Northern Elephant Seal

The California Breeding Stock of Northern elephant seals (Mirounga angustirostris) breeds and gives birth in California, but makes extended foraging trips to areas including coastal Oregon biannually during the fall and spring (Le Boeuf *et al*., 2000). They spend about 90 percent of their time at sea underwater, making sequential deep dives. While both males and females may transit areas off the Oregon coast, males seem to have focal forage areas near the continental shelf break while females typically move further offshore and feed opportunistically at numerous sites while in route (Le Beouf *et al*., 2000). Prior to 1984, only two sightings of Northern elephant seals were

recorded (Jeffries 1984). Since then, they have been seen infrequently near the mouth of the Columbia River.

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Not all marine mammal species have equal hearing capabilities (*e.g.*, Richardson *et al.*, 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007, 2019) recommended that marine mammals be divided into hearing groups based on directly measured (behavioral or auditory evoked potential techniques) or estimated hearing ranges (behavioral response data, anatomical modeling, etc.). Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.*, low-frequency cetaceans). Subsequently, NMFS (2018) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 decibel (dB) threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. Marine mammal hearing groups and their associated hearing ranges are provided in Table 4.

Table 4. Marine Mammal Hearing Groups (NMFS, 2018).

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
High-frequency (HF) cetaceans (true porpoises, *Kogia*, river dolphins, Cephalorhynchid, *Lagenorhynchus cruciger* & *L. australis*)	275 Hz to 160 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 kHz

***** Represents the generalized hearing range for the entire group as a composite (*i.e.,* all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall *et al.* 2007) and PW pinniped (approximation).

The pinniped functional hearing group was modified from Southall *et al*. (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al*., 2006; Kastelein *et al*., 2009; Reichmuth and Holt, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018) for a review of available information.

Potential Effects of Specified Activities on Marine Mammals and their Habitat

This section includes a discussion of the ways that components of the specified activity may impact marine mammals and their habitat. The **Estimated Take** section later in this document includes a quantitative analysis of the number of individuals that are expected to be taken by this activity. The **Negligible Impact Analysis and Determination** section considers the content of this section, the **Estimated Take** section, and the **Proposed Mitigation** section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and whether those impacts are reasonably expected to, or reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

Acoustic effects on marine mammals during the specified activities can occur from impact pile driving and vibratory driving and removal. The effects of underwater noise from the Corps' proposed activities have the potential to result in Level A or Level B harassment of marine mammals in the action areas.

Description of Sound Sources

The marine soundscape is comprised of both ambient and anthropogenic sounds. Ambient sound is defined as the all-encompassing sound in a given place and is usually a composite of sound from many sources both near and far (ANSI 1995). The sound level of an area is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (*e.g.*, waves, wind, precipitation, earthquakes, ice, atmospheric sound), biological (*e.g.*, sounds produced by marine mammals, fish, and invertebrates), and anthropogenic sound (*e.g.*, vessels, dredging, aircraft, construction).

The sum of the various natural and anthropogenic sound sources at any given location and time – which comprise "ambient" or "background" sound – depends not only on the source levels (as determined by current weather conditions and levels of biological and shipping activity) but also on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor, and is frequency-dependent. As a result of the dependence on a large number of varying factors, ambient sound levels can be expected to vary widely over both coarse and fine spatial and temporal scales. Sound levels at a given frequency and location can vary by 10-20 decibels (dB) from day to day (Richardson *et al.*, 1995). The result is that, depending on the source type and its intensity, sound from the specified activities may be a negligible addition to the local environment or could form a distinctive signal that may affect marine mammals.

In-water construction activities associated with the project would include impact and vibratory pile driving and removal. The sounds produced by these activities fall into one of two general sound types: impulsive and non-impulsive. Impulsive sounds (*e.g.*, explosions, sonic booms, impact pile driving) are typically transient, brief (less than 1 second), broadband, and consist of high peak sound pressure with rapid rise time and rapid decay (ANSI, 1986; NIOSH, 1998; NMFS, 2018). Non-impulsive sounds (*e.g.*, machinery operations such as drilling or dredging, vibratory pile driving, underwater chainsaws, and active sonar systems) can be broadband, narrowband or tonal, brief or prolonged (continuous or intermittent), and typically do not have the high peak sound pressure with raid rise/decay time that impulsive sounds do (ANSI 1995; NIOSH 1998; NMFS 2018). The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (*e.g.*, Ward 1997 in Southall *et al*., 2007).

Two types of hammers would be used on this project, impact and vibratory. Impact hammers operate by repeatedly dropping and/or pushing a heavy piston onto a pile to drive the pile into the substrate. Sound generated by impact hammers is considered impulsive. Vibratory hammers install piles by vibrating them and allowing the weight of the hammer to push them into the sediment. Vibratory hammers produce non-impulsive, continuous sounds. Vibratory hammering generally produces SPLs 10 to 20 dB lower than impact pile driving of the same-sized pile (Oestman *et al*., 2009). Rise time is slower, reducing the probability and severity of injury, and sound energy is distributed over a greater amount of time (Nedwell and Edwards, 2002; Carlson *et al*., 2005).

The likely or possible impacts of the Corps' proposed activities on marine mammals could be generated from both non-acoustic and acoustic stressors. Potential non-acoustic stressors include the physical presence of the equipment, vessels, and personnel; however, we expect that any animals that approach the project site(s) close

enough to be harassed due to the presence of equipment or personnel would be within the Level B harassment zones from pile driving and would already be subject to harassment from the in-water activities. Therefore, any impacts to marine mammals are expected to primarily be acoustic in nature. Acoustic stressors are generated by heavy equipment operation during pile installation and removal (*i.e.*, impact and vibratory pile driving and removal).

Acoustic Impacts

The introduction of anthropogenic noise into the aquatic environment from pile driving equipment is the primary means by which marine mammals may be harassed from the Corps' specified activities. In general, animals exposed to natural or anthropogenic sound may experience physical and psychological effects, ranging in magnitude from none to severe (Southall *et al*., 2007). Generally, exposure to pile driving and removal and other construction noise has the potential to result in auditory threshold shifts and behavioral reactions (*e.g.,* avoidance, temporary cessation of foraging and vocalizing, changes in dive behavior). Exposure to anthropogenic noise can also lead to non-observable physiological responses such as an increase in stress hormones. Additional noise in a marine mammal's habitat can mask acoustic cues used by marine mammals to carry out daily functions such as communication and predator and prey detection. The effects of pile driving and demolition noise on marine mammals are dependent on several factors, including, but not limited to, sound type (*e.g.,* impulsive vs. non-impulsive), the species, age and sex class (*e.g.,* adult male vs. mother with calf), duration of exposure, the distance between the pile and the animal, received levels, behavior at time of exposure, and previous history with exposure (Wartzok *et al.,* 2004; Southall *et al*., 2007). Here we discuss physical auditory effects (threshold shifts) followed by behavioral effects and potential impacts on habitat. No physiological effects

other than PTS are anticipated or proposed to be authorized, and therefore are not discussed further.

NMFS defines a noise-induced threshold shift (TS) as a change, usually an increase, in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS, 2018). The amount of threshold shift is customarily expressed in dB. A TS can be permanent or temporary. As described in NMFS (2018), there are numerous factors to consider when examining the consequence of TS, including, but not limited to, the signal temporal pattern (*e.g.,* impulsive or non-impulsive), likelihood an individual would be exposed for a long enough duration or to a high enough level to induce a TS, the magnitude of the TS, time to recovery (seconds to minutes or hours to days), the frequency range of the exposure (*i.e.,* spectral content), the hearing and vocalization frequency range of the exposed species relative to the signal's frequency spectrum (*i.e.,* how animal uses sound within the frequency band of the signal; *e.g.*, Kastelein *et al.,* 2014), and the overlap between the animal and the source (*e.g.,* spatial, temporal, and spectral).

Permanent Threshold Shift (PTS) - NMFS defines PTS as a permanent, irreversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS 2018). Available data from humans and other terrestrial mammals indicate that a 40 dB threshold shift approximates PTS onset (see Ward *et al*., 1958, 1959; Ward, 1960; Kryter *et al.,* 1966; Miller, 1974; Ahroon *et al*., 1996; Henderson *et al*., 2008). PTS levels for marine mammals are estimates, because there are limited empirical data measuring PTS in marine mammals (*e.g.*, Kastak *et al.*, 2008), largely due to the fact that, for various ethical reasons, experiments involving anthropogenic noise exposure at levels inducing PTS are not typically pursued or authorized (NMFS, 2018).

Temporary Threshold Shift (TTS) - TTS is a temporary, reversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS, 2018). Based on data from cetacean TTS measurements (see Southall *et al.,* 2007), a TTS of 6 dB is considered the minimum threshold shift clearly larger than any day-to-day or session-to-session variation in a subject's normal hearing ability (Schlundt *et al*., 2000; Finneran *et al*., 2000, 2002). As described in Finneran (2016), marine mammal studies have shown the amount of TTS increases with cumulative sound exposure level (SEL_{cum}) in an accelerating fashion: At low exposures with lower SEL_{cum}, the amount of TTS is typically small and the growth curves have shallow slopes. At exposures with higher SEL_{cum}, the growth curves become steeper and approach linear relationships with the noise SEL.

Depending on the degree (elevation of threshold in dB), duration (*i.e*., recovery time), and frequency range of TTS, and the context in which it is experienced, TTS can have effects on marine mammals ranging from discountable to serious (similar to those discussed in auditory masking, below). For example, a marine mammal may be able to readily compensate for a brief, relatively small amount of TTS in a non-critical frequency range that takes place during a time when the animal is traveling through the open ocean, where ambient noise is lower and there are not as many competing sounds present. Alternatively, a larger amount and longer duration of TTS sustained during time when communication is critical for successful mother/calf interactions could have more serious impacts. We note that reduced hearing sensitivity as a simple function of aging has been observed in marine mammals, as well as humans and other taxa (Southall *et al.,* 2007), so we can infer that strategies exist for coping with this condition to some degree, though likely not without cost.

Currently, TTS data only exist for four species of cetaceans (bottlenose dolphin, beluga whale (*Delphinapterus leucas*), harbor porpoise, and Yangtze finless porpoise (*Neophocoena asiaeorientalis*)) and five species of pinnipeds exposed to a limited number of sound sources (*i.e.*, mostly tones and octave-band noise) in laboratory settings (Finneran, 2015). TTS was not observed in trained spotted (*Phoca largha*) and ringed (*Pusa hispida*) seals exposed to impulsive noise at levels matching previous predictions of TTS onset (Reichmuth *et al*., 2016). In general, harbor seals and harbor porpoises have a lower TTS onset than other measured pinniped or cetacean species (Finneran, 2015). The potential for TTS from impact pile driving exists. After exposure to playbacks of impact pile driving sounds (rate 2,760 strikes/hour) in captivity, mean TTS increased from 0 dB after 15 minute exposure to 5 dB after 360 minute exposure; recovery occurred within 60 minutes (Kastelein *et al*., 2016). Additionally, the existing marine mammal TTS data come from a limited number of individuals within these species. No data are available on noise-induced hearing loss for mysticetes. Nonetheless, what we considered is the best available science. For summaries of data on TTS in marine mammals or for further discussion of TTS onset thresholds, please see Southall *et al*. (2007), Finneran and Jenkins (2012), Finneran (2015), and Table 5 in NMFS (2018).

Installing piles for this project requires impact pile driving. There would likely be pauses in activities producing the sound during each day. Given these pauses and the fact that many marine mammals are likely moving through the project areas and not remaining for extended periods of time, the potential for TS declines.

Behavioral Harassment - Exposure to noise from pile driving and removal also has the potential to behaviorally disturb marine mammals. Available studies show wide variation in response to underwater sound; therefore, it is difficult to predict specifically how any given sound in a particular instance might affect marine mammals perceiving the signal. If a marine mammal does react briefly to an underwater sound by changing its

behavior or moving a small distance, the impacts of the change are unlikely to be significant to the individual, let alone the stock or population. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on individuals and populations could be significant (*e.g.*, Lusseau and Bejder, 2007; Weilgart, 2007; NRC, 2005).

Disturbance may result in changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); or avoidance of areas where sound sources are located. Pinnipeds may increase their haul-out time, possibly to avoid in-water disturbance (Thorson and Reyff, 2006). Behavioral responses to sound are highly variable and context-specific and any reactions depend on numerous intrinsic and extrinsic factors (*e.g.*, species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day), as well as the interplay between factors (*e.g.*, Richardson *et al.*, 1995; Wartzok *et al.*, 2004; Southall *et al.*, 2007; Weilgart, 2007; Archer *et al.*, 2010). Behavioral reactions can vary not only among individuals but also within an individual, depending on previous experience with a sound source, context, and numerous other factors (Ellison *et al.*, 2012), and can vary depending on characteristics associated with the sound source (*e.g.*, whether it is moving or stationary, number of sources, distance from the source). In general, pinnipeds seem more tolerant of, or at least habituate more quickly to, potentially disturbing underwater sound than do cetaceans, and generally seem to be less responsive to exposure to industrial sound than most cetaceans. Please see Appendices B and C of Southall *et al.* (2007) for a review of studies involving marine mammal behavioral responses to sound.

Disruption of feeding behavior can be difficult to correlate with anthropogenic sound exposure, so it is usually inferred by observed displacement from known foraging

areas, the appearance of secondary indicators (*e.g.*, bubble nets or sediment plumes), or changes in dive behavior. As for other types of behavioral response, the frequency, duration, and temporal pattern of signal presentation, as well as differences in species sensitivity, are likely contributing factors to differences in response in any given circumstance (*e.g.*, Croll *et al*., 2001; Nowacek *et al*., 2004; Madsen *et al*., 2006; Yazvenko *et al*., 2007). A determination of whether foraging disruptions incur fitness consequences would require information on or estimates of the energetic requirements of the affected individuals and the relationship between prey availability, foraging effort and success, and the life history stage of the animal.

In 2016, the Alaska Department of Transportation and Public Facilities (ADOT&PF) documented observations of marine mammals during construction activities (*i.e.,* pile driving) at the Kodiak Ferry Dock (see 80 FR 60636, October 7, 2015). In the marine mammal monitoring report for that project (ABR 2016), 1,281 Steller sea lions were observed within the Level B disturbance zone during pile driving or drilling (*i.e.,* documented as Level B harassment take). Of these, 19 individuals demonstrated an alert behavior, 7 were fleeing, and 19 swam away from the project site. All other animals (98 percent) were engaged in activities such as milling, foraging, or fighting and did not change their behavior. In addition, two sea lions approached within 20 m of active vibratory pile driving activities. Three harbor seals were observed within the disturbance zone during pile driving activities; none of them displayed disturbance behaviors. Fifteen killer whales and three harbor porpoise were also observed within the Level B harassment zone during pile driving. The killer whales were travelling or milling while all harbor porpoises were travelling. No signs of disturbance were noted for either of these species. Given the similarities in species, activities, and habitat (*e.g.*, cool-temperate waters, industrialized area), we expect similar behavioral responses from the

same and similar species affected by the Corps' specified activities. That is, disturbance, if any, is likely to be temporary and localized (*e.g.,* small area movements).

Stress responses – An animal's perception of a threat may be sufficient to trigger stress responses consisting of some combination of behavioral responses, autonomic nervous system responses, neuroendocrine responses, or immune responses (*e.g.*, Seyle 1950; Moberg 2000). In many cases, an animal's first and sometimes most economical (in terms of energetic costs) response is behavioral avoidance of the potential stressor. Autonomic nervous system responses to stress typically involve changes in heart rate, blood pressure, and gastrointestinal activity. These responses have a relatively short duration and may or may not have a significant long-term effect on an animal's fitness.

Neuroendocrine stress responses often involve the hypothalamus-pituitary-adrenal system. Virtually all neuroendocrine functions that are affected by stress – including immune competence, reproduction, metabolism, and behavior – are regulated by pituitary hormones. Stress-induced changes in the secretion of pituitary hormones have been implicated in failed reproduction, altered metabolism, reduced immune competence, and behavioral disturbance (*e.g.*, Moberg 1987; Blecha 2000). Increases in the circulation of glucocorticoids are also equated with stress (Romano *et al.*, 2004).

The primary distinction between stress (which is adaptive and does not normally place an animal at risk) and "distress" is the cost of the response. During a stress response, an animal uses glycogen stores that can be quickly replenished once the stress is alleviated. In such circumstances, the cost of the stress response would not pose serious fitness consequences. However, when an animal does not have sufficient energy reserves to satisfy the energetic costs of a stress response, energy resources must be diverted from other functions. This state of distress will last until the animal replenishes its energetic reserves sufficient to restore normal function.

Relationships between these physiological mechanisms, animal behavior, and the costs of stress responses are well-studied through controlled experiments and for both laboratory and free-ranging animals (*e.g.*, Holberton *et al.*, 1996; Hood *et al.*, 1998; Jessop *et al.*, 2003; Krausman *et al.*, 2004; Lankford *et al.*, 2005). Stress responses due to exposure to anthropogenic sounds or other stressors and their effects on marine mammals have also been reviewed (Fair and Becker 2000; Romano *et al.*, 2002b) and, more rarely, studied in wild populations (*e.g.*, Romano *et al.*, 2002a). For example, Rolland *et al.* (2012) found that noise reduction from reduced ship traffic in the Bay of Fundy was associated with decreased stress in North Atlantic right whales. These and other studies lead to a reasonable expectation that some marine mammals will experience physiological stress responses upon exposure to acoustic stressors and that it is possible that some of these would be classified as "distress." In addition, any animal experiencing TTS would likely also experience stress responses (NRC, 2003), however distress is an unlikely result of these projects based on observations of marine mammals during previous, similar projects in the area.

Masking - Sound can disrupt behavior through masking, or interfering with, an animal's ability to detect, recognize, or discriminate between acoustic signals of interest (*e.g.*, those used for intraspecific communication and social interactions, prey detection, predator avoidance, navigation) (Richardson *et al*., 1995). Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher intensity, and may occur whether the sound is natural (*e.g.*, snapping shrimp, wind, waves, precipitation) or anthropogenic (*e.g.*, pile driving, shipping, sonar, seismic exploration) in origin. The ability of a noise source to mask biologically important sounds depends on the characteristics of both the noise source and the signal of interest (*e.g.*, signal-to-noise ratio, temporal variability, direction), in relation to each other and to an animal's hearing abilities (*e.g.*, sensitivity, frequency

range, critical ratios, frequency discrimination, directional discrimination, age or TTS hearing loss), and existing ambient noise and propagation conditions. Masking of natural sounds can result when human activities produce high levels of background sound at frequencies important to marine mammals. Conversely, if the background level of underwater sound is high (*e.g.*, on a day with strong wind and high waves), an anthropogenic sound source would not be detectable as far away as would be possible under quieter conditions and would itself be masked. The mouth of the Columbia River area contains active commercial shipping and commercial fishing as well as numerous recreational and other commercial vessels, and background sound levels in the area are already elevated.

Airborne Acoustic Effects - Pinnipeds that occur near the project site could be exposed to airborne sounds associated with pile driving and removal that have the potential to cause behavioral harassment, depending on their distance from pile driving activities. Cetaceans are not expected to be exposed to airborne sounds that would result in harassment as defined under the MMPA.

Airborne noise would primarily be an issue for pinnipeds that are swimming or hauled out near the project site within the range of noise levels elevated above the acoustic criteria. We recognize that pinnipeds in the water could be exposed to airborne sound that may result in behavioral harassment when looking with their heads above water. Most likely, airborne sound would cause behavioral responses similar to those discussed above in relation to underwater sound. For instance, anthropogenic sound could cause hauled-out pinnipeds to exhibit changes in their normal behavior, such as reduction in vocalizations, or cause them to temporarily abandon the area and move further from the source. However, these animals would likely previously have been ‘taken’ because of exposure to underwater sound above the behavioral harassment thresholds, which are generally larger than those associated with airborne sound. Thus, the behavioral

harassment of these animals is already accounted for in these estimates of potential take. Therefore, we do not believe that authorization of incidental take resulting from airborne sound for pinnipeds is warranted, and airborne sound is not discussed further here.

Marine Mammal Habitat Effects

The Corps' proposed construction activities could have localized, temporary impacts on marine mammal habitat, including prey, by increasing in-water sound pressure levels and slightly decreasing water quality. Increased noise levels may affect acoustic habitat (see masking discussion above) and adversely affect marine mammal prey in the vicinity of the project areas (see discussion below). During impact and vibratory pile driving or removal, elevated levels of underwater noise would ensonify the project areas where both fishes and mammals occur and could affect foraging success. Additionally, marine mammals may avoid the area during construction, however, displacement due to noise is expected to be temporary and is not expected to result in long-term effects to the individuals or populations. Construction activities are of short duration and would likely have temporary impacts on marine mammal habitat through increases in underwater and airborne sound.

A temporary and localized increase in turbidity near the seafloor would occur in the immediate area surrounding the area where piles are installed or removed. In general, turbidity associated with pile installation is localized to about a 25-ft (7.6-m) radius around the pile (Everitt *et al.,* 1980). The sediments of the project site will settle out rapidly when disturbed. Cetaceans are not expected to be close enough to the pile driving areas to experience effects of turbidity, and any pinnipeds could avoid localized areas of turbidity. Local currents are anticipated to disburse any additional suspended sediments produced by project activities at moderate to rapid rates depending on tidal stage. Therefore, we expect the impact from increased turbidity levels to be discountable to marine mammals and do not discuss it further.

In-water Construction Effects on Potential Foraging Habitat

The area likely impacted by the project is relatively small compared to the available habitat in the lower Columbia River. The area is highly influenced by anthropogenic activities. The total seafloor area affected by pile installation and removal is a small area compared to the vast foraging area available to marine mammals in the area. At best, the impact area provides marginal foraging habitat for marine mammals and fishes. Furthermore, pile driving and removal at the project site would not obstruct long-term movements or migration of marine mammals.

Avoidance by potential prey (*i.e.*, fish or, in the case of transient killer whales, other marine mammals) of the immediate area due to the temporary loss of this foraging habitat is also possible. The duration of fish and marine mammal avoidance of this area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution, and behavior is anticipated. Any behavioral avoidance by fish or marine mammals of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity.

In-water Construction Effects on Potential Prey - Sound may affect marine mammals through impacts on the abundance, behavior, or distribution of prey species (*e.g.*, crustaceans, cephalopods, fish, zooplankton, other marine mammals). Marine mammal prey varies by species, season, and location. Here, we describe studies regarding the effects of noise on known marine mammal prey other than other marine mammals (which have been discussed earlier).

Fish utilize the soundscape and components of sound in their environment to perform important functions such as foraging, predator avoidance, mating, and spawning (*e.g.*, Zelick and Mann, 1999; Fay, 2009). Depending on their hearing anatomy and peripheral sensory structures, which vary among species, fishes hear sounds using pressure and particle motion sensitivity capabilities and detect the motion of surrounding

water (Fay *et al.*, 2008). The potential effects of noise on fishes depends on the overlapping frequency range, distance from the sound source, water depth of exposure, and species-specific hearing sensitivity, anatomy, and physiology. Key impacts to fishes may include behavioral responses, hearing damage, barotrauma (pressure-related injuries), and mortality.

Fish react to sounds which are especially strong and/or intermittent low-frequency sounds, and behavioral responses such as flight or avoidance are the most likely effects. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. The reaction of fish to noise depends on the physiological state of the fish, past exposures, motivation (*e.g.*, feeding, spawning, migration), and other environmental factors. Hastings and Popper (2005) identified several studies that suggest fish may relocate to avoid certain areas of sound energy. Additional studies have documented effects of pile driving on fish; several are based on studies in support of large, multiyear bridge construction projects (*e.g.*, Scholik and Yan, 2001, 2002; Popper and Hastings, 2009). Several studies have demonstrated that impulse sounds might affect the distribution and behavior of some fishes, potentially impacting foraging opportunities or increasing energetic costs (*e.g.*, Fewtrell and McCauley, 2012; Pearson *et al.*, 1992; Skalski *et al.*, 1992; Santulli *et al.*, 1999; Paxton *et al.*, 2017). However, some studies have shown no or slight reaction to impulse sounds (*e.g.*, Pena *et al.*, 2013; Wardle *et al.*, 2001; Jorgenson and Gyselman, 2009; Popper *et al.*, 2015).

SPLs of sufficient strength have been known to cause injury to fish and fish mortality. However, in most fish species, hair cells in the ear continuously regenerate and loss of auditory function likely is restored when damaged cells are replaced with new cells. Halvorsen *et al.* (2012a) showed that a TTS of 4-6 dB was recoverable within 24 hours for one species. Impacts would be most severe when the individual fish is close to the source and when the duration of exposure is long. Injury caused by barotrauma can

range from slight to severe and can cause death, and is most likely for fish with swim bladders. Barotrauma injuries have been documented during controlled exposure to impact pile driving (Halvorsen *et al.*, 2012b; Casper *et al.*, 2013).

The most likely impact to fishes from pile driving and removal and construction activities at the project area would be temporary behavioral avoidance of the area. The duration of fish avoidance of this area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution, and behavior is anticipated.

Construction activities, in the form of increased turbidity, have the potential to adversely affect forage fish in the project areas. Forage fish form a significant prey base for many marine mammal species that occur in the project areas. Increased turbidity is expected to occur in the immediate vicinity (on the order of 10 ft (3 m) or less) of construction activities. However, suspended sediments and particulates are expected to dissipate quickly within a single tidal cycle. Given the limited area affected and high tidal dilution rates any effects on forage fish are expected to be minor or negligible. Finally, exposure to turbid waters from construction activities is not expected to be different from the current exposure; fish and marine mammals in Elliott Bay are routinely exposed to substantial levels of suspended sediment from natural and anthropogenic sources.

In summary, given the short daily duration of sound associated with individual pile driving events and the relatively small areas being affected, pile driving activities associated with the proposed actions are not likely to have a permanent, adverse effect on any fish habitat, or populations of fish species. Any behavioral avoidance by fish of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity. Thus, we conclude that impacts of the specified activities are not likely to have more than short-term adverse effects on any prey habitat or populations of prey species. Further, any impacts to marine mammal habitat are not

expected to result in significant or long-term consequences for individual marine mammals, or to contribute to adverse impacts on their populations.

Estimated Take

This section provides an estimate of the number of incidental takes proposed for authorization through this IHA, which will inform both NMFS' consideration of "small numbers" and the negligible impact determinations.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as any act of pursuit, torment, or annoyance, which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes would primarily be by Level B harassment (in the form of behavioral disturbance and TTS), as use of the acoustic sources (*i.e.*, vibratory or impact pile driving and removal) have the potential to result in disruption of behavioral patterns and cause a temporary loss in hearing sensitivity for individual marine mammals. There is also some potential for auditory injury (Level A harassment) to result for porpoises and harbor seals because predicted auditory injury zones are larger. The proposed mitigation and monitoring measures are expected to minimize the severity of the taking to the extent practicable.

As described previously, no serious injury or mortality is anticipated or proposed to be authorized for this activity. Below we describe how the proposed take numbers are estimated.

For acoustic impacts, generally speaking, we estimate take by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates

marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) the number of days of activities. We note that while these factors can contribute to a basic calculation to provide an initial prediction of potential takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.,* previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the proposed take estimates.

Acoustic Thresholds

NMFS recommends the use of acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B Harassment – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source or exposure context (*e.g.*, frequency, predictability, duty cycle, duration of the exposure, signal-to-noise ratio, distance to the source), the environment (*e.g.*, bathymetry, other noises in the area, predators in the area), and the receiving animals (hearing, motivation, experience, demography, life stage, depth) and can be difficult to predict (*e.g.*, Southall *et al.,* 2007, 2021, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a metric that is both predictable and measurable for most activities, NMFS typically uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS generally predicts that marine mammals are likely to be behaviorally harassed in a manner considered to be Level B harassment when exposed to underwater anthropogenic noise above root-mean-squared pressure received

levels (RMS SPL) of 120 dB (referenced to 1 micropascal (re 1 µPa)) for continuous (*e.g.,* vibratory pile-driving, drilling) and above RMS SPL 160 dB re 1 µPa for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources.

The Corps' proposed activities includes the use of continuous (vibratory hammer) and impulsive (impact hammer) sources, and therefore the 120 and 160 dB re 1 µPa (rms) thresholds are applicable.

Level A Harassment – NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (Technical Guidance, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). The Corps' activities include the use of impulsive (impact hammer) and non-impulsive (vibratory hammer) sources.

These thresholds are provided in the table below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS' 2018 Technical Guidance, which may be accessed at: *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance*.

Table 5. Thresholds Identifying the Onset of Permanent Threshold Shift.

	PTS Onset Acoustic Thresholds* (Received Level)	
Hearing Group	**Impulsive**	**Non-impulsive**
Low-Frequency (LF) Cetaceans	*Cell 1* $L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	*Cell 2* $L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	*Cell 3* $L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	*Cell 4* $L_{E,MF,24h}$: 198 dB
High-Frequency (HF) Cetaceans	*Cell 5* $L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	*Cell 6* $L_{E,HF,24h}$: 173 dB

Phocid Pinnipeds (PW) (Underwater)	*Cell 7* $L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	*Cell 8* $L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	*Cell 9* $L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	*Cell 10* $L_{E,OW,24h}$: 219 dB

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Note: Peak sound pressure (L_{pk}) has a reference value of 1 µPa, and cumulative sound exposure level (L_E) has a reference value of 1µPa^{2}s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (*i.e.*, varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

Ensonified Area

Here, we describe operational and environmental parameters of the activity that are used in estimating the area ensonified above the acoustic thresholds, including source levels and transmission loss coefficient.

The sound field in the project area is the existing background noise plus additional construction noise from the proposed project. Marine mammals are expected to be affected by sound generated by the primary components of the project (*i.e.*, impact and vibratory pile driving).

In order to calculate distances to the Level A harassment and Level B harassment thresholds for the methods and piles being used in this project, NMFS used acoustic monitoring data from other locations to develop source levels for the various pile types, sizes, and methods the Corps proposes to use (Table 6).

Table 6. Source Levels

Pile type and method	Source Level (dB re 1 µPa)			Reference
	Peak	RMS	SEL	

24-in steel pipe impact installation	203 dB	190 dB	177 dB	CalTrans (2015)
24-in steel pipe pile vibratory installation/removal	Not available	161 dB	Not available	U.S. Navy (2015)
24-in steel sheet pile vibratory installation/removal	175 dB	160 dB	160 dB	CalTrans (2015)

Level B Harassment Zones

Transmission loss (TL) is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for underwater TL is:

TL = B * Log10 (R1/R2), where

TL = transmission loss in dB

B = transmission loss coefficient; for practical spreading equals 15

R1 = the distance of the modeled SPL from the driven pile, and

R2 = the distance from the driven pile of the initial measurement

The recommended TL coefficient for most nearshore environments is the practical spreading value of 15. This value results in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions, which is the most appropriate assumption for the Corps' proposed activities in the absence of specific modelling. The Level B harassment zones for the Corps' proposed activities are shown in Table 7.

Level A Harassment Zones

The ensonified area associated with Level A harassment is more technically challenging to predict due to the need to account for a duration component. Therefore, NMFS developed an optional User Spreadsheet tool to accompany the Technical

Guidance that can be used to relatively simply predict an isopleth distance for use in conjunction with marine mammal density or occurrence to help predict potential takes. We note that because of some of the assumptions included in the methods underlying this optional tool, we anticipate that the resulting isopleth estimates are typically going to be overestimates of some degree, which may result in an overestimate of potential take by Level A harassment. However, this optional tool offers the best way to estimate isopleth distances when more sophisticated modeling methods are not available or practical. For stationary sources such as pile installation or removal, the optional User Spreadsheet tool predicts the distance at which, if a marine mammal remained at that distance for the duration of the activity, it would be expected to incur PTS. The isopleths generated by the User Spreadsheet used the same TL coefficient as the Level B harassment zone calculations (*i.e.*, the practical spreading value of 15). Inputs used in the User Spreadsheet (*e.g.*, number of piles per day, duration and/or strikes per pile) are presented in Tables 1 and 2, and the resulting isopleths are reported below in Table 7. Due to the bathymetry and geography of the project areas, sound may not reach the full distance of the harassment isopleths in all directions.

Table 7. Level A Harassment and Level B Harassment Zones

Pile type and method	Level A Harassment zone (m)					Level B harassment zone (m)
	LF Cetacean	MF Cetacean	HF Cetacean	Phocid Pinniped	Otariid Pinniped	
24-in Steel Pile Impact Installation	430.0	15.3	512.2	230.1	16.8	1,000
24-in Steel Pile Vibratory Installation	7.9	0.7	11.7	4.8	0.3	5,412
Steel Sheet Pile Vibratory Installation	36.8	3.3	54.4	22.4	1.6	4,642

Steel Sheet Pile Vibratory Removal	9.6	0.9	14.2	5.8	0.4	4,642

Marine Mammal Occurrence and Take Calculation and Estimation

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the proposed take incidental to the Corps' pile driving activities. Unless otherwise specified, the term "pile driving" in this section, and all following sections, may refer to either pile installation or removal. Unless otherwise specified, the occurrence information described below is used to estimate take for both the Year 1 and Year 2 IHAs. NMFS has carefully reviewed the Corps' analysis and concludes that it represents an appropriate and accurate method for estimating incidental take caused by the Corps' activities.

Steller Sea Lion, California Sea Lion, and Harbor Seal

For Steller sea lions , California sea lions, and harbor seals, the numbers of individuals were referenced from WDFW's surveys from 2000-2014 at the South Jetty for the months of in water work (August through October) and averaged to get an estimated daily count (Table 8). While animals were surveyed at the prominent haul out site along the South Jetty, since the Sand Island pile dikes are very close to the mouth of the river and the South Jetty, the Corps assumed each of these estimates represent the total number of individuals present in the project vicinity. In instances where proposed activities will occur over a span of two or more months, the Corps derived potential take estimates from the average abundance recorded over the specified period. For harbor seals, where abundance was only estimated in July, the Corps used that estimate for all projections.

Table 8. Pinniped Counts from the South Jetty from 2000-2014 (WDFW 2014)

	Steller sea lion	California sea lion	Harbor seal
August	324	115	57
Average August-September	267	182	57
September	209	249	57
October	384	508	57
Average (all months)	306	291	57

To calculate the total estimated takes by Level B harassment, the Corps multiplied the estimated days of activity within each month (or total across months) by the associated monthly (or average across months) count of each species (Table 9).

Table 9. Estimated take of Steller Sea Lions, California Sea Lions, and Harbor Seals by Level B harassment

Project element	Month(s)	Days of pile driving in month(s)	Steller sea lion average count	Steller sea lion calculated take	California sea lion average count	California sea lion calculate take	Harbor seal average count	Harbor seal calculated take
Year 1								
Pile Dike 6.37	August-September	56	267	14,952	182	10,192	57	3,192
MOF	October	11	384	4,224	508	5,588	57	627
Total takes by Level B harassment:				19,176	Total:	15,780	Total:	3,819
Year 2								
Pile Dike 6.37	August	24	324	7,776	115	2,760	57	1,368
Pile Dike 5.15	August through October	71	306	21,726	291	20,661	57	4,047
Total takes by Level B harassment:				29,502	Total:	23,421	Total:	5,415

Based on the relative proportion of the area expected to be ensonified above the Level A harassment threshold for phocid pinnipeds from impact pile driving of 24-in steel pipe piles (approximately 0.23 square kilometers (km^2)) to the area ensonified above

the Level B harassment threshold (up to 94 km^2 for vibratory installation of 24-in steel pipe piles), the Corps estimated that of the total number of harbor seals that may be located within the greater Level B harassment zone, no more than 1 percent would approach the pile driving activities closer and enter the smaller Level A harassment zone (231 m). Thus the Corps assumes that 1 percent of the total estimated takes of harbor seals (3,819 individuals in Year 1 and 5,415 individuals in Year 2; see Table 9) would be by Level A harassment. Therefore, the Corps has requested, and NMFS is proposing to authorize, 38 takes of harbor seals by Level A harassment and 3,781 takes by Level B harassment in Year 1 and 54 takes of harbor seals by Level A harassment and 5,361 takes by Level B harassment in Year 2 (Table 10).

The largest Level A harassment zone for otariid pinnipeds is 16.8 m. The Corps would be required to enforce a minimum shutdown zone of 25 m for these species. At that close range, the Corps would be able to detect California sea lions and Steller sea lions and implement the required shutdown measures before any sea lions could enter the Level A harassment zone. Therefore, no takes of California sea lions or Steller sea lions by Level A harassment are requested or proposed to be authorized.

Humpback Whale

Humpback whales have been observed in the immediate vicinity of the project area in recent years. Humpbacks have been arriving in the lower Columbia estuary as early as mid-June and have been observed as late as mid-November with a peak of abundance coinciding with the peak abundance of forage fish in mid-summer. No surveys were located for the project area, but it is assumed that they could be present during pile driving activities. Given the higher observed abundances in summer, the Corps assumes up to two individuals per month could enter the Level B harassment zone during pile driving activities each year, for a total of 6 takes of humpback whales by Level B harassment in each year (Table 10).

The largest Level A harassment zone for low-frequency cetaceans for any pile type or method is 430 m. During impact pile driving, the Corps would be required to implement a shutdown zone equivalent to the Level A harassment zone for low-frequency cetaceans. Given the visibility of humpback whales, the Corps would be able to detect humpback whales and shut down pile driving before any humpbacks could enter the Level A harassment zone. Therefore, no take of humpback whales by Level A harassment is requested or proposed to be authorized.

Transient Killer Whale

Killer whales were not detected in fall and winter aerial surveys off the Oregon coast documented in Adams *et al*. (2014). Aerial seabird marine mammal surveys observed zero killer whales in January 2011, zero in February 2012, and 10 in September 2012 within an approximately 1,500 km2 range near the MCR (Adams 2014). While a rare occurrence, a pod of transient killer whales were detected near the Astoria Bridge in May of 2018 (Frankowicz 2018). There have been no confirmed sightings of southern resident killer whales entering the project area. The Corps estimates that no more than 2 transient killer whales per year could be near the mouth of the Columbia River during proposed work and taken by Level B harassment (Table 10).

The largest Level A harassment zone for mid-frequency cetaceans for any pile type or method is 15.3 m. The Corps would be required to implement a minimum 25 m shutdown zone for mid-frequency cetaceans. Given the visibility of killer whales, at that close range, the Corps would be able to detect transient killer whales and shut down pile driving before any killer whales could enter the Level A harassment zone. Therefore, no take of transient killer whales by Level A harassment is requested or proposed to be authorized.

Harbor Porpoise

Harbor porpoises are regularly observed in the oceanward waters adjacent to the project area and are known to occur year-round. Their nearshore abundance peaks with anchovy presence, which is generally June through October. There was one recorded sighting of a harbor porpoise in the project area east of the jetties in the Sept-Nov timeframe (OBIS-SEAMAP 2019). Therefore, it is feasible that animals could be present during pile driving activities. During monitoring for pile driving at the Columbia River Jetty System, over the course of a 5-day monitoring period, observers detected 5 harbor porpoises (Grette Associates 2016). Given the potential for harbor porpoise to travel in pairs, the Corps estimates that one pair of harbor porpoises per day may enter the Level B harassment zone per day of pile driving (67 days in Year 1 and 95 days in Year 2) for a total of 134 harbor porpoises taken in Year 1 and 190 taken in Year 2.

For impact installation of 24-in steel pipe piles, the Level A harassment zone for high-frequency cetaceans is 512 m. Although the Corps would be required to implement a shutdown zone of 515 m during this activity (see **Proposed Mitigation**), due to the cryptic nature and lower detectability of harbor porpoises at large distances, the Corps anticipates that up to 16 of the harbor porpoises (2 per week over the course of 8 weeks of impact pile driving) that enter the Level B zone in Year 1 could approach the project site closer and potentially enter the Level A harassment zone undetected during impact installation. Similarly, the Corps estimates that up to 27 of the harbor porpoises that enter the Level B harassment zone in Year 2 (2 per week over the course of 13.5 weeks of impact pile driving) could approach the project site closer and potentially enter the Level A harassment zone undetected during impact installation. These takes by Level A harassment could occur as one group in one day or single animals over multiple days. In total, the Corps has requested take of 134 harbor porpoises in Year 1 (118 takes by Level B harassment and 16 takes by Level A harassment) and 190 harbor porpoises in Year 2 (163 takes by Level B harassment and 27 takes by Level A harassment) (Table 10).

Northern Elephant Seal

Northern elephant seals have been observed near the mouth of the Columbia River, but there are no known haulout locations for northern elephant seals in the project vicinity. Given the rarity of sightings in and around the Columbia River, the Corps estimates that no more than 2 northern elephant seals per month may enter the project area and be taken by Level B harassment each year, for a total of 6 takes by Level B harassment in Year 1 and 6 takes by Level B harassment in Year 2 (Table 10).

The largest Level A harassment zone (230 m) occurs during impact installation of 24-in steel pipe piles. It is unlikely that northern elephant seals would be found within this zone, and even more unlikely that northern elephant seals would be found within the Level A harassment zones for vibratory pile driving of any pile size (less than 23 m for all pile types). However, even if northern elephant seals were encountered in the project areas, at that close range, the Corps would be able to detect them and implement the required shutdown measures before any northern elephant seals could enter the Level A harassment zones. Therefore, no take of northern elephant seals by Level A harassment is requested or proposed to be authorized.

Table 10. Proposed Take of Marine Mammals by Level A and Level B Harassment by Year, by Species and Stock and Percent of Take by Stock

Species	Proposed Take by Level A Harassment	Proposed Take by Level B Harassment	Total Proposed Take	Stock	Stock Abundance	Percent of Stock
Year 1						
Humpback whale	0	6	6	California/Oregon/Washington	2,900	0.21
Killer whale	0	2	2	West Coast Transient	349	0.57
Harbor porpoise	16	118	134	Northern Oregon/Washington Coast	21,487	0.60

California sea lion	0	15,780	15,780	U.S.	257,606	6.13
Steller sea lion	0	19,176	19,176	Eastern	52,932	36.23
Harbor seal	38	3,781	3,819	Oregon/Washington Coast	24,732	15.44
Northern elephant seal	0	6	6	California Breeding	179,000	0.003
Year 2						
Humpback whale	0	6	6	California/Oregon/Washington	2,900	0.21
Killer whale	0	2	2	West Coast Transient	349	0.57
Harbor porpoise	27	163	190	Northern Oregon/Washington Coast	21,487	0.88
California sea lion	0	23,421	23,421	U.S.	257,606	9.09
Steller sea lion	0	29,502	29,502	Eastern	52,932	55.74
Harbor seal	54	5,361	5,415	Oregon/Washington Coast	24,732	21.89
Northern elephant seal	0	6	6	California Breeding	179,000	0.003

Proposed Mitigation

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to the activity, and other means of effecting the least practicable impact on the species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stock for taking for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting the activity or other

means of effecting the least practicable adverse impact upon the affected species or stocks, and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, NMFS considers two primary factors:

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (probability implemented as planned), and;

(2) The practicability of the measures for applicant implementation, which may consider such things as cost and impact on operations.

Time Restrictions

The Corps has provided in its description of the project that pile driving would occur only during daylight hours (no sooner than 30 minutes after sunrise through no later than 30 minutes before sunset), when visual monitoring of marine mammals can be conducted. In addition, to minimize impacts to ESA-listed fish species, all in-water construction would be limited to the months of August through November.

Shutdown Zones

Before the commencement of in-water construction activities, the Corps would establish shutdown zones for all activities. The purpose of a shutdown zone is generally to define an area within which shutdown of the activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area). Pile driving would also not commence until all marine mammals are clear of their respective

shutdown zones. Shutdown zones are meant to encompass the Level A harassment zones and therefore would vary based on the activity type and marine mammal hearing group (Table 11). At minimum, the shutdown zone for all hearing groups and all activities is 25 m. For in-water heavy machinery work other than pile driving (*e.g.*, standard barges, *etc.*), if a marine mammal comes within 25 m, operations would cease and vessels would reduce speed to the minimum level required to maintain steerage and safe working conditions. This type of work could include, for example, the movement of the barge to the pile location or positioning of the pile on the substrate via a crane.

The Corps would also establish shutdown zones for all marine mammals for which take has not been authorized or for which incidental take has been authorized but the authorized number of takes has been met. These zones are equivalent to the Level B harassment zones for each activity (see Table 11).

Table 11. Shutdown Zones

Pile type and method	Shutdown zones by hearing group (m)					Shutdown zones for unauthorized species (m)
	LF Cetacean	MF Cetacean	HF Cetacean	Phocid Pinniped	Otariid Pinniped	
24-in Steel pipe Pile Impact Installation	430	25	515	50[a]	25	1,000
24-in Steel pipe pile Vibratory Installation	25	25	25	25	25	5,412
24-in Steel Sheet Pile Vibratory Installation[b]	40	25	55	25	25	4,642
24-in Steel Sheet Pile Vibratory Removal[b]	25	25	25	25	25	4,642

[a] 50 m is for harbor seals, shutdown zone for northern elephant seals is 235 m.
[b] Vibratory installation and removal of 24-in steel sheet piles only applicable in Year 1. No sheet piles will be installed or removed in Year 2.

Protected Species Observers

The placement of protected species observers (PSOs) during all pile driving activities (described in the **Proposed Monitoring and Reporting** section) would ensure that the entire shutdown zone is visible. Should environmental conditions deteriorate such that the entire shutdown zone would not be visible (*e.g.*, fog, heavy rain), pile driving would be delayed until the PSO is confident marine mammals within the shutdown zone could be detected.

Monitoring for Level A and Level B Harassment

PSOs would monitor the Level B harassment zones to the extent practicable, and all of the Level A harassment zones. Monitoring zones provide utility for observing by establishing monitoring protocols for areas adjacent to the shutdown zones. Monitoring zones enable observers to be aware of and communicate the presence of marine mammals in the project areas outside the shutdown zones and thus prepare for a potential cessation of activity should the animal enter the shutdown zone.

Pre-Activity Monitoring

Prior to the start of daily in-water construction activity, or whenever a break in pile driving of 30 minutes or longer occurs, PSOs would observe the shutdown and monitoring zones for a period of 30 minutes. The shutdown zone would be considered cleared when a marine mammal has not been observed within the zone for that 30-minute period. If a marine mammal is observed within the shutdown zones listed in Tables 12 and 13, pile driving activity would be delayed or halted. If pile driving is delayed or halted due to the presence of a marine mammal, the activity would not commence or resume until either the animal has voluntarily exited and been visually confirmed beyond the shutdown zones or 15 minutes have passed without re-detection of the animal. When a marine mammal for which Level B harassment take is authorized is present in the Level B harassment zone, activities would begin and Level B harassment take would be recorded. If work ceases for more than 30 minutes, the pre-activity monitoring of the

shutdown zones would commence. A determination that the shutdown zone is clear must be made during a period of good visibility (*i.e.*, the entire shutdown zone and surrounding waters must be visible to the naked eye).

Soft Start

Soft-start procedures are used to provide additional protection to marine mammals by providing warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full capacity. For impact pile driving, contractors would be required to provide an initial set of three strikes from the hammer at reduced energy, followed by a 30-second waiting period, then two subsequent reduced-energy strike sets. Soft start would be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of 30 minutes or longer.

Based on our evaluation of the Corps' proposed measures, as well as other measures considered by NMFS, NMFS has preliminarily determined that the proposed mitigation measures provide the means of effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Proposed Monitoring and Reporting

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present while conducting the activities. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density);
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas);
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and,
- Mitigation and monitoring effectiveness.

Visual Monitoring

Marine mammal monitoring during pile driving activities would be conducted by PSOs meeting NMFS' standards and in a manner consistent with the following:

- Independent PSOs (*i.e.,* not construction personnel) who have no other assigned tasks during monitoring periods would be used;

- At least one PSO would have prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued incidental take authorization;
- Other PSOs may substitute education (degree in biological science or related field) or training for experience; and
- Where a team of three or more PSOs is required, a lead observer or monitoring coordinator would be designated. The lead observer would be required to have prior experience working as a marine mammal observer during construction.

PSOs would have the following additional qualifications:

- Ability to conduct field observations and collect data according to assigned protocols;
- Experience or training in the field identification of marine mammals, including the identification of behaviors;
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates, times, and reason for implementation of mitigation (or why mitigation was not implemented when required); and marine mammal behavior; and
- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.

The Corps would have at least 2 PSOs stationed in the project area to monitor during all pile driving activities. One PSO would be positioned at the work site on the construction barge to observe Level A harassment and shutdown zones. At least one PSO

would monitor from a boat to ensure full visual coverage of the Level B harassment zone(s) and alert construction crews of marine mammals entering the Level B harassment zone and/or approaching the Level A harassment zones. Additional PSOs may be employed during periods of low or obstructed visibility to ensure the entirety of the shutdown zones are monitored.

Monitoring would be conducted 30 minutes before, during, and 30 minutes after all in water construction activities. In addition, observers would record all incidents of marine mammal occurrence, regardless of distance from activity, and would document any behavioral reactions in concert with distance from piles being driven or removed. Pile driving activities include the time to install or remove a single pile or series of piles, as long as the time elapsed between uses of the pile driving equipment is no more than 30 minutes.

Reporting

A draft marine mammal monitoring report would be submitted to NMFS within 90 days after the completion of pile driving activities, or 60 days prior to a requested date of issuance of any future IHAs for the project, or other projects at the same location, whichever comes first. The marine mammal report would include an overall description of work completed, a narrative regarding marine mammal sightings, and associated PSO data sheets. Specifically, the report would include:

- Dates and times (begin and end) of all marine mammal monitoring;
- Construction activities occurring during each daily observation period, including: (a) How many and what type of piles were driven or removed and the method (*i.e.,* impact or vibratory); and (b) the total duration of time for each pile (vibratory driving) number of strikes for each pile (impact driving);
- PSO locations during marine mammal monitoring; and

- Environmental conditions during monitoring periods (at beginning and end of PSO shift and whenever conditions change significantly), including Beaufort sea state and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon, and estimated observable distance.

For each observation of a marine mammal, the following would be reported:

- Name of PSO who sighted the animal(s) and PSO location and activity at time of sighting;
- Time of sighting;
- Identification of the animal(s) (*e.g.,* genus/species, lowest possible taxonomic level, or unidentified), PSO confidence in identification, and the composition of the group if there is a mix of species;
- Distance and location of each observed marine mammal relative to the pile being driven or hole being drilled for each sighting;
- Estimated number of animals (min/max/best estimate);
- Estimated number of animals by cohort (adults, juveniles, neonates, group composition, etc.);
- Description of any marine mammal behavioral observations (*e.g.,* observed behaviors such as feeding or traveling), including an assessment of behavioral responses thought to have resulted from the activity (*e.g.,* no response or changes in behavioral state such as ceasing feeding, changing direction, flushing, or breaching);
- Number of marine mammals detected within the harassment zones, by species; and
- Detailed information about implementation of any mitigation (*e.g.,* shutdowns and delays), a description of specified actions that ensued, and resulting changes in behavior of the animal(s), if any.

If no comments are received from NMFS within 30 days, the draft reports would constitute the final reports. If comments are received, a final report addressing NMFS' comments would be required to be submitted within 30 days after receipt of comments. All PSO datasheets and/or raw sighting data would be submitted with the draft marine mammal report.

In the event that personnel involved in the construction activities discover an injured or dead marine mammal, the Corps would report the incident to the Office of Protected Resources (OPR) (PR.ITP.MonitoringReports@noaa.gov), NMFS and to the West Coast Region (WCR) regional stranding coordinator as soon as feasible. If the death or injury was clearly caused by the specified activity, the Corps would immediately cease the specified activities until NMFS is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the terms of the IHAs. The Corps would not resume their activities until notified by NMFS.

The report would include the following information:

1. Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
2. Species identification (if known) or description of the animal(s) involved;
3. Condition of the animal(s) (including carcass condition if the animal is dead);
4. Observed behaviors of the animal(s), if alive;
5. If available, photographs or video footage of the animal(s); and
6. General circumstances under which the animal was discovered.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50

CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through harassment, NMFS considers other factors, such as the likely nature of any impacts or responses (*e.g.*, intensity, duration), the context of any impacts or responses (*e.g.*, critical reproductive time or location, foraging impacts affecting energetics), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS' implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, the discussion of our analysis applies to all species listed in Table 10, given that the anticipated effects of this activity on these different marine mammal stocks are expected to be similar. There is little information about the nature or severity of the impacts, or the size, status, or structure of any of these species or stocks that would lead to a different analysis for this activity. We note, though, that there are far fewer estimated takes of cetaceans than pinnipeds, and some additional pinniped-specific analysis is included.

Pile driving activities associated with the Sand Island Pile Dikes Repairs Project have the potential to disturb or displace marine mammals. Specifically, the project activities may result in take, in the form of Level A and Level B harassment, from

underwater sounds generated from pile driving. Potential takes could occur if individuals are present in the ensonified zone when these activities are underway.

The takes from Level A and Level B harassment would be due to potential behavioral disturbance, TTS, and PTS. No serious injury or mortality is anticipated given the nature of the activities and measures designed to minimize the possibility of injury to marine mammals. The potential for harassment is minimized through the construction method and the implementation of the planned mitigation measures (see **Proposed Mitigation** section).

In both years, take by Level A harassment is proposed for 2 species (harbor seals and harbor porpoise) to account for the possibility that an animal could enter a Level A harassment zone prior to detection, and remain within that zone for a duration long enough to incur PTS before being observed and the Corps shutting down pile driving activity. Any take by Level A harassment is expected to arise from, at most, a small degree of PTS, *i.e.*, minor degradation of hearing capabilities within regions of hearing that align most completely with the energy produced by impact pile driving (*i.e.* the low-frequency region below 2 kHz), not severe hearing impairment or impairment within the ranges of greatest hearing sensitivity. Animals would need to be exposed to higher levels and/or longer duration than are expected to occur here in order to incur any more than a small degree of PTS.

Additionally, the amount of authorized take by Level A harassment is very low for all marine mammal stocks and species. For both IHAs, for 5 of 7 affected stocks, NMFS anticipates and proposes to authorize no Level A harassment take over the duration of the Corps' planned activities; for the other 2 stocks, NMFS authorizes no more than 54 takes by Level A harassment in any year. If hearing impairment occurs, it is most likely that the affected animal would lose only a few decibels in its hearing sensitivity. These takes of individuals by Level A harassment (*i.e.,* a small degree of

PTS) are not expected to accrue in a manner that would affect the reproductive success or survival of any individuals, much less result in adverse impacts on the species or stock.

As described above, NMFS expects that marine mammals would likely move away from an aversive stimulus, especially at levels that would be expected to result in PTS, given sufficient notice through use of soft start. The Corps would also shut down pile driving activities if marine mammals approach within hearing group-specific zones that encompass the Level A harassment zones (see Table 11) further minimizing the likelihood and degree of PTS that would be incurred. Even absent mitigation, no serious injury or mortality from construction activities is anticipated or authorized.

Effects on individuals that are taken by Level B harassment in the form of behavioral disruption, on the basis of reports in the literature as well as monitoring from other similar activities, including the Sand Island Pile Dike System Test Piles Project conducted by the Corps in preparation for the proposed Sand Island Pile Dikes Repairs Project (84 FR 61026; November 12, 2019), would likely be limited to reactions such as avoidance, increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring) (*e.g.,* Thorson and Reyff 2006). Most likely, individuals would simply move away from the sound source and temporarily avoid the area where pile driving is occurring. If sound produced by project activities is sufficiently disturbing, animals are likely to simply avoid the area while the activities are occurring, particularly as the project is located on a busy waterway at the mouth of the Columbia River with high amounts of vessel traffic. We expect that any avoidance of the project areas by marine mammals would be temporary in nature and that any marine mammals that avoid the project areas during construction would not be permanently displaced. Short-term avoidance of the project areas and energetic impacts of interrupted foraging or other important behaviors is unlikely to affect the reproduction or survival of individual marine

mammals, and the effects of behavioral disturbance on individuals is not likely to accrue in a manner that would affect the rates of recruitment or survival of any affected stock.

Additionally, and as noted previously, some subset of the individuals that are behaviorally harassed could also simultaneously incur some small degree of TTS for a short duration of time. However, since the hearing sensitivity of individuals that incur TTS is expected to recover completely within minutes to hours, it is unlikely that the brief hearing impairment would affect the individual's long-term ability to forage and communicate with conspecifics, and would therefore not likely impact reproduction or survival of any individual marine mammal, let alone adversely affect rates of recruitment or survival of the species or stock.

The project is also not expected to have significant adverse effects on affected marine mammals' habitats. The project activities will not modify existing marine mammal habitat for a significant amount of time. The activities may cause some fish to leave the area of disturbance, thus temporarily impacting marine mammals' foraging opportunities in a limited portion of the foraging range; but, because of the short duration of the activities and the relatively small area of the habitat that may be affected (with no known particular importance to marine mammals), the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences. The shores along the Columbia River are occasionally used by harbor seals for pupping, but the Corps' proposed activities would occur outside of the harbor seal pupping season. There are no known important areas for other marine mammals, such as feeding or pupping areas.

For all species and stocks, and in both years, take would occur within a limited, relatively confined area (the mouth of the Columbia River) of the stock's range. Given the availability of suitable habitat nearby, any displacement of marine mammals from the project areas is not expected to affect marine mammals' fitness, survival, and

reproduction due to the limited geographic area that would be affected in comparison to the much larger habitat for marine mammals within the lower Columbia River and immediately outside the river along the Oregon and Washington coasts. Level A harassment and Level B harassment would be reduced to the level of least practicable adverse impact to the marine mammal species or stocks and their habitat through use of mitigation measures described herein.

Some individual marine mammals in the project areas may be present and be subject to repeated exposure to sound from pile driving on multiple days. However, pile driving is not expected to occur on every day of the in-water work window, and these individuals would likely return to normal behavior during gaps in pile driving activity within each day of construction and in between work days. As discussed above, there is similar foraging and haulout habitat available for marine mammals within and outside of the Columbia River along the Washington and Oregon coasts, outside of the project area, where individuals could temporarily relocate during construction activities to reduce exposure to elevated sound levels from the project. Therefore, any behavioral effects of repeated or long duration exposures are not expected to negatively affect survival or reproductive success of any individuals. Thus, even repeated Level B harassment of some small subset of an overall stock is unlikely to result in any effects on rates of reproduction and survival of the stock.

In summary and as described above, the following factors primarily support our preliminary determination that the impacts resulting from this activity are not expected to adversely affect any of the species or stocks through effects on annual rates of recruitment or survival:

- No mortality or serious injury is anticipated or proposed to be authorized for either year;

- In both years, Level A harassment is not anticipated or authorized for 5 of the 7 species. For the other 2 species (1 high-frequency cetacean and 1 phocid pinniped), the amount of Level A harassment is low and would be in the form of a slight degree of PTS in limited low frequency ranges (< 2 kHz) which are not the most sensitive primary hearing ranges for these species and would not interfere with conspecific communication or echolocation;
- For both years, Level B harassment would be in the form of behavioral disturbance, primarily resulting in avoidance of the project areas around where impact or vibratory pile driving is occurring, and some low-level TTS that may limit the detection of acoustic cues for relatively brief amounts of time in relatively confined footprints of the activities;
- Nearby areas of similar habitat value (*e.g.*, foraging and haulout habitats) within and outside the lower Columbia River are available for marine mammals that may temporarily vacate the project areas during construction activities for both projects;
- Effects on species that serve as prey for marine mammals from the activities are expected to be short-term and, therefore, any associated impacts on marine mammal feeding are not expected to result in significant or long-term consequences for individuals, or to accrue to adverse impacts on their populations from either project;
- The ensonified areas in both years are very small relative to the overall habitat ranges of all species and stocks, and will not adversely affect ESA-designated critical habitat for any species or any areas of known biological importance;
- The lack of anticipated significant or long-term negative effects to marine mammal habitat from either project;
- The efficacy of the mitigation measures in reducing the effects of the specified activities on all species and stocks for both projects;

- The enhanced mitigation measures (*e.g.*, shutdown zones equivalent to the Level B harassment zones) to eliminate the potential for any take of unauthorized species; and
- Monitoring reports from similar work in the lower Columbia River, including previous work at the Sand Island Pile Dikes, that have documented little to no behavioral effect on individuals of the same species that could be impacted by the specified activities from both projects, suggesting the degree/intensity of behavioral harassment would be minimal.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the proposed monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take from the proposed activities in Year 1 will have a negligible impact on all affected marine mammal species or stocks. NMFS also preliminarily finds that the total marine mammal take from the proposed activities in Year 2 will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under sections 101(a)(5)(A) and (D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. When the predicted number of individuals to be taken is fewer than one-third of the species or stock abundance, the take is considered to be of small numbers.

Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

For all species other than Steller sea lions, the proposed take in each year is below one third of the population for all marine mammal stocks (Table 10). In Year 1 and Year 2, the proposed take of Steller sea lions, as a proportion of the stock abundance is 36.23 percent and 55.74 percent, respectively, if all takes are assumed to occur for unique individuals. In reality, it is unlikely that all takes would occur to different individuals. The project area represents a small portion of the stock's overall range (from Alaska to California (Muto *et al.*, 2019)) and based on observations at other Steller sea lion haulouts, it is reasonable to expect individual animals to be present at the haulout and in the water nearby on multiple days during the activities. Therefore, it is more likely that there will be multiple takes of a smaller number of individuals within the project area, such that the number of individuals taken would be less than one third of the population.

Based on the analysis contained herein of the proposed activity (including the proposed mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS preliminarily finds that small numbers of marine mammals would be taken relative to the population size of the affected species or stocks in Year 1. NMFS also preliminarily finds that small numbers of marine mammals would be taken relative to the population size of the affected species or stocks in Year 2.

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. Therefore, NMFS has determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. 1531 *et seq*.) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally whenever we propose to authorize take for endangered or threatened species, in this case with the West Coast Regional Office.

NMFS is proposing to authorize take of humpback whales from the Mexico and Central America DPSs, which are listed under the ESA. The Permits and Conservation Division has requested initiation of section 7 consultation with the West Coast Region for the issuance of this IHA. NMFS will conclude the ESA consultation prior to reaching a determination regarding the proposed issuance of the authorization.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue two sequential IHAs to the Corps for conducting the Sand Island Pile Dikes Repairs Project in the lower Columbia River, beginning in August 2023, with the previously mentioned mitigation, monitoring, and reporting requirements incorporated. A draft of the proposed IHAs can be found at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities*.

Request for Public Comments

We request comment on our analyses, the proposed authorization, and any other aspect of this notice of 2 proposed sequential IHAs for the proposed Sand Island Pile Dikes Repairs Project. We also request comment on the potential renewal of these proposed IHAs as described in the paragraph below. Please include with your comments any supporting data or literature citations to help inform decisions on the request for these IHAs or subsequent renewal IHAs.

On a case-by-case basis, NMFS may issue a one-time, one-year renewal IHA following notice to the public providing an additional 15 days for public comments when (1) up to another year of identical or nearly identical activities as described in the **Description of Proposed Activities** section of this notice is planned or (2) the activities as described in the **Description of Proposed Activities** section of this notice would not be completed by the time the IHA expires and a renewal would allow for completion of the activities beyond that described in the *Dates and Duration* section of this notice, provided all of the following conditions are met:

- A request for renewal is received no later than 60 days prior to the needed renewal IHA effective date (recognizing that the renewal IHA expiration date cannot extend beyond one year from expiration of the initial IHA).
- The request for renewal must include the following:

(1) An explanation that the activities to be conducted under the requested renewal IHA are identical to the activities analyzed under the initial IHA, are a subset of the activities, or include changes so minor (*e.g.*, reduction in pile size) that the changes do not affect the previous analyses, mitigation and monitoring requirements, or take estimates (with the exception of reducing the type or amount of take).

(2) A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized.

Upon review of the request for renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures will remain the same and appropriate, and the findings in the initial IHA remain valid.

Dated: June 28, 2022.

Kimberly Damon-Randall,
Director, Office of Protected Resources,
National Marine Fisheries Service.

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